US009261272B2

(12) **United States Patent**
McConnell

(10) **Patent No.: US 9,261,272 B2**
(45) **Date of Patent: Feb. 16, 2016**

(54) **MARINE LIGHT FIXTURE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 296 days.

(21) Appl. No.: **13/654,112**

(22) Filed: **Oct. 17, 2012**

(65) **Prior Publication Data**

US 2013/0100661 A1 Apr. 25, 2013

Related U.S. Application Data

(60) Provisional application No. 61/551,296, filed on Oct. 25, 2011.

(51) **Int. Cl.**

F21V 7/04	(2006.01)
F21V 31/00	(2006.01)
F21V 14/04	(2006.01)
F21W 101/04	(2006.01)
F21Y 101/02	(2006.01)
F21Y 105/00	(2006.01)
B63B 45/04	(2006.01)

(52) **U.S. Cl.**

CPC ***F21V 31/005*** (2013.01); ***F21V 7/041*** (2013.01); ***F21V 14/04*** (2013.01); *B63B 45/04* (2013.01); *F21W 2101/04* (2013.01); *F21Y 2101/02* (2013.01); *F21Y 2105/001* (2013.01)

(58) **Field of Classification Search**

CPC F21W 2101/04; F21V 14/006; F21V 31/005; F21V 7/041

See application file for complete search history.

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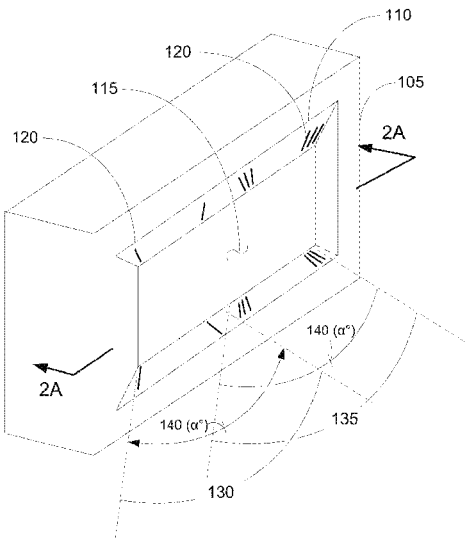
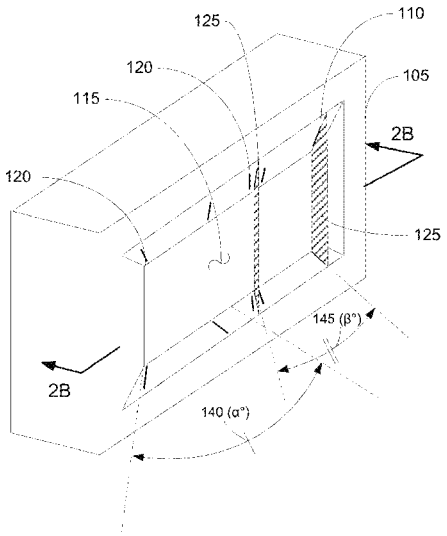
(57) **ABSTRACT**

Configurable light fixtures are provided. The light fixture includes a housing having an opening. At least one reflector having at least a first and a second configurable throw pattern, is disposed within the housing proximate the opening. The reflector accommodates the post-manufacture installation of a number of reflective throw pattern adjustment members to provide first and second configurable throw patterns having subtended angles with the same or different values.

13 Claims, 7 Drawing Sheets





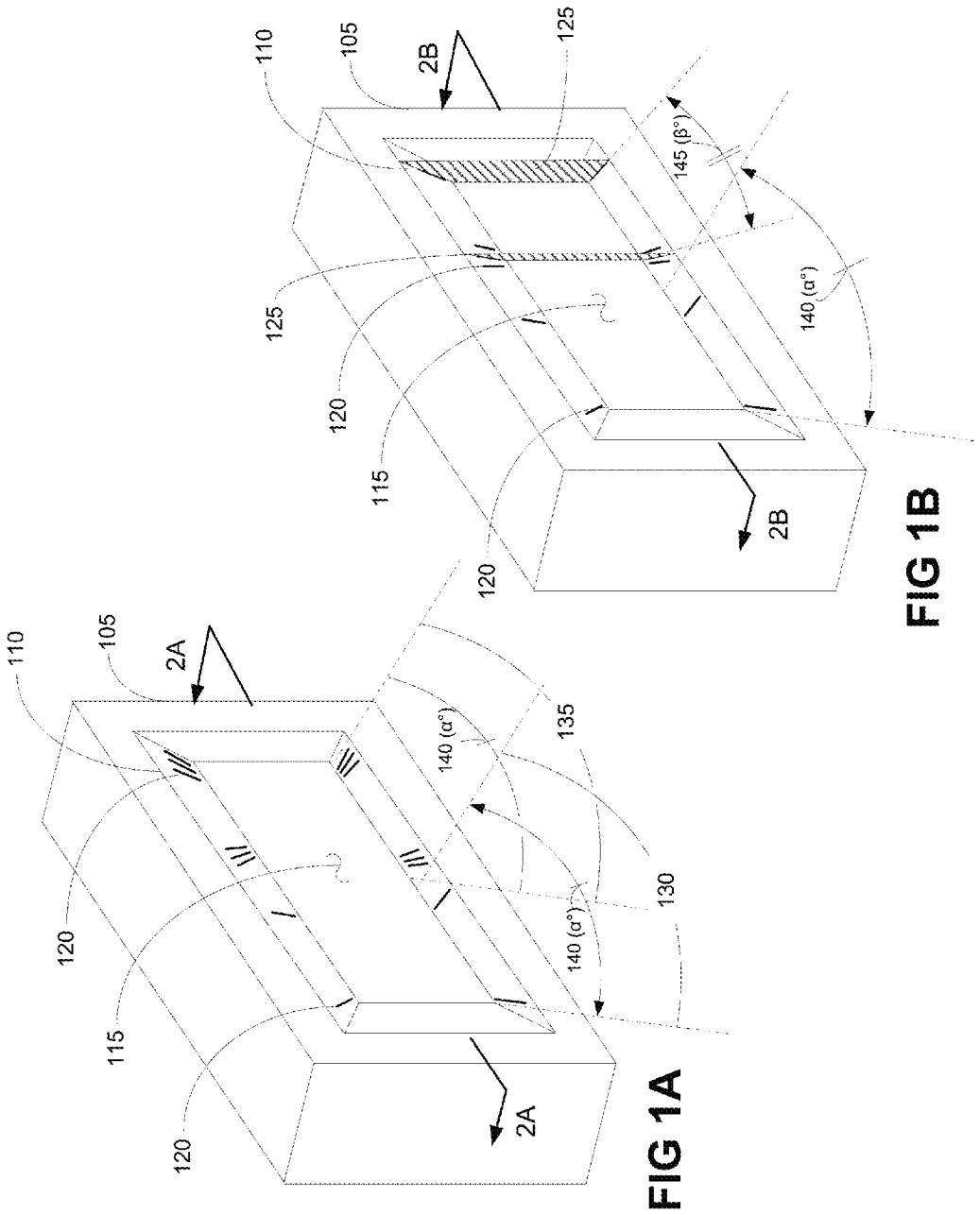

110
105
2B
125
145 (β°)
140 (α°)
125
120
115
120
2B
110
105
2A
140 (α°)
135
130
120
115
120
140 (α°)
2A

FIG 1B

FIG 1A

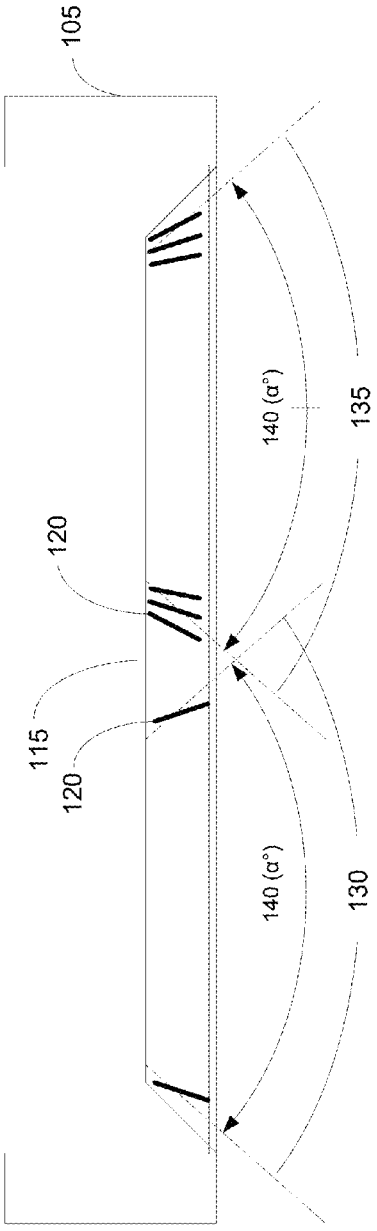
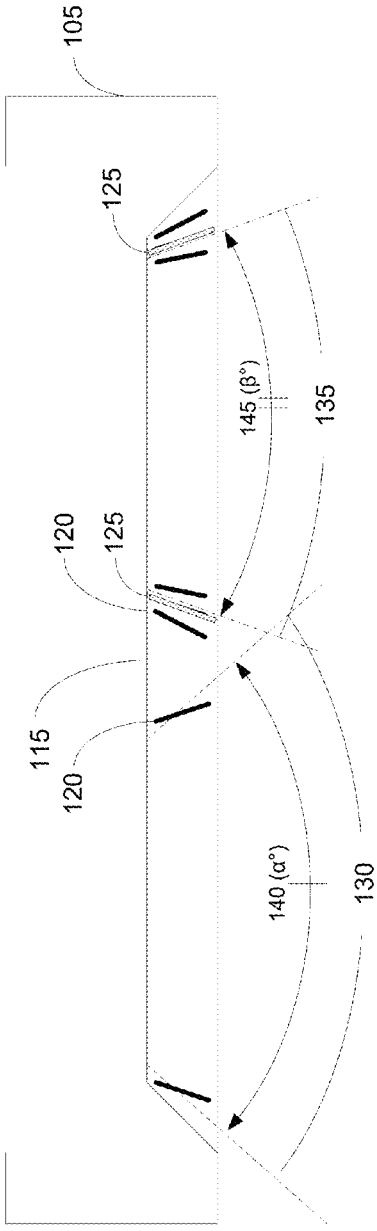

105
120
115
120
140 (α°)
135
140 (α°)
130

FIG 2A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115
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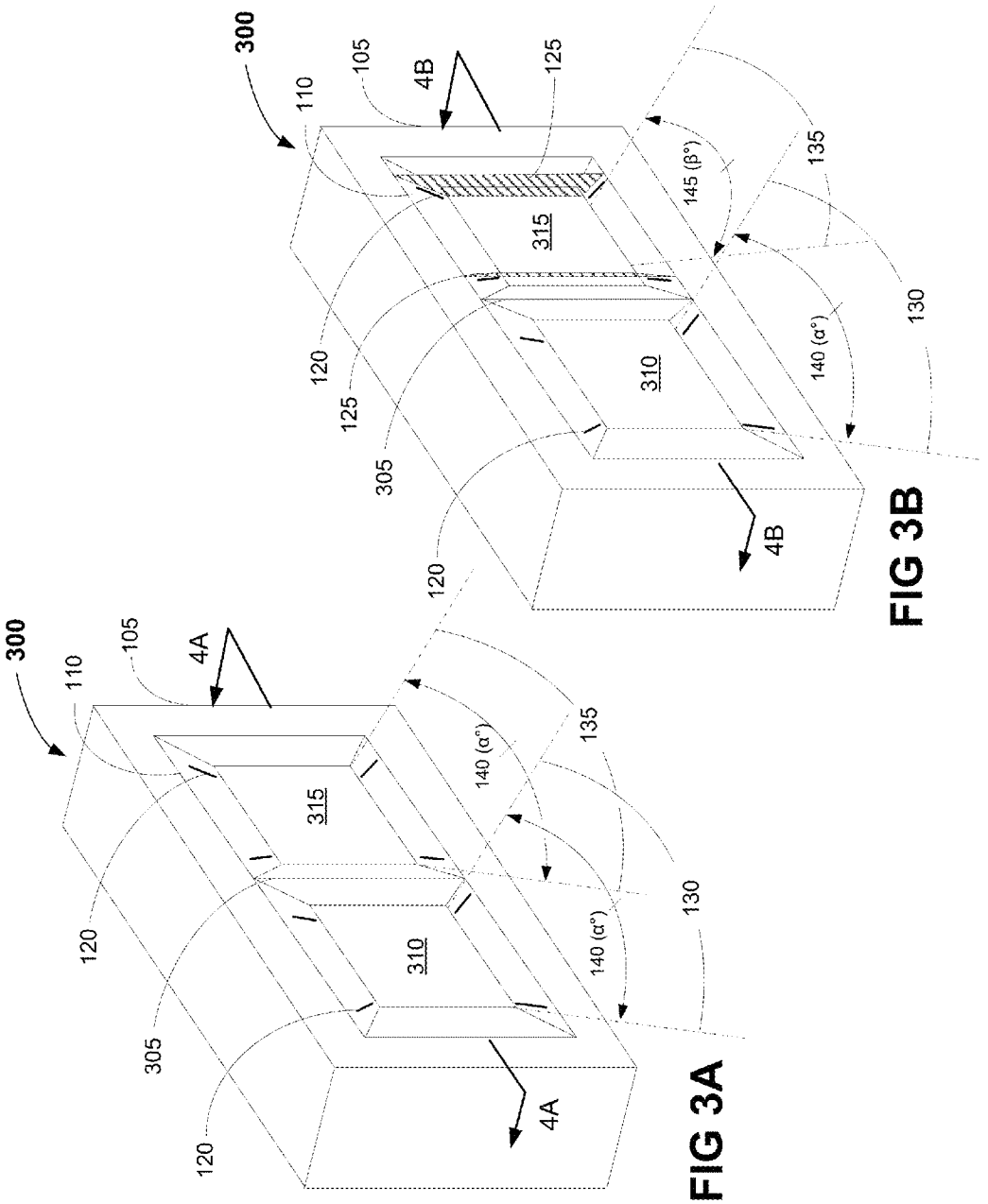
130

FIG 2B


300
110
105
4A
315
310
120
305
120
140 (α°)
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130
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4A
300
110
105
4B
125
315
310
120
125
305
120
145 (β°)
135
130
140 (α°)
4B

FIG 3A

FIG 3B

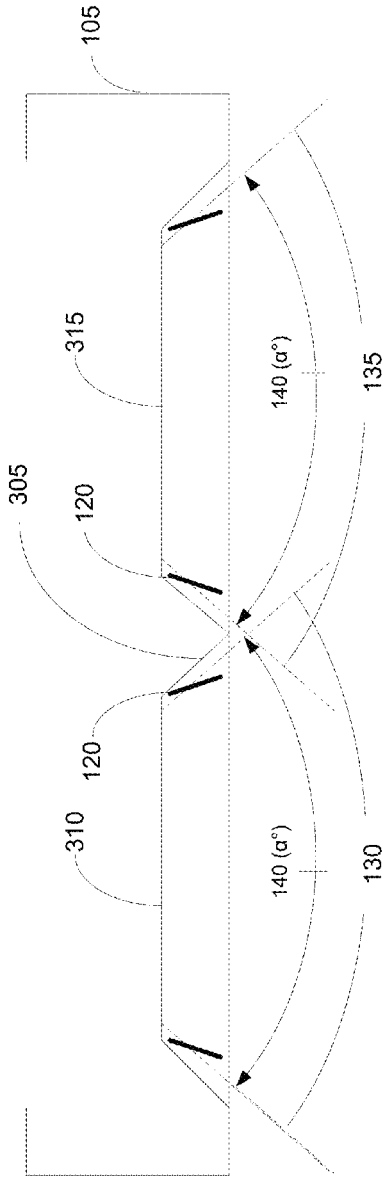
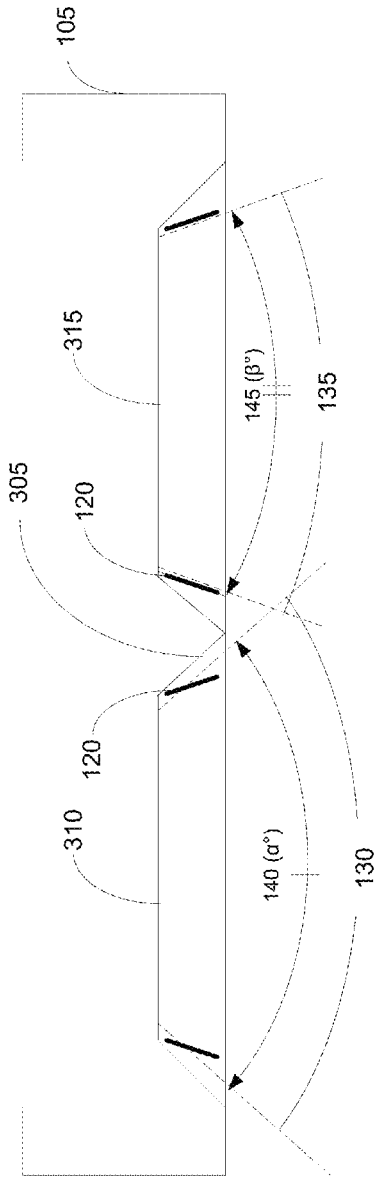

105
315
305
120
120
310
140 (α°)
135
140 (α°)
130

FIG 4A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315
305
120
120
310
145 (β°)
135
140 (α°)
130

FIG 4B

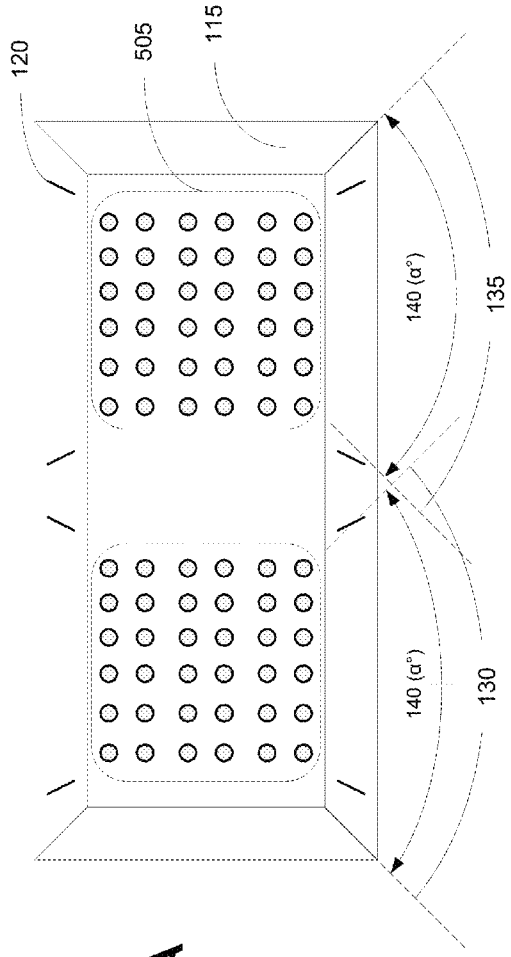

FIG 5A

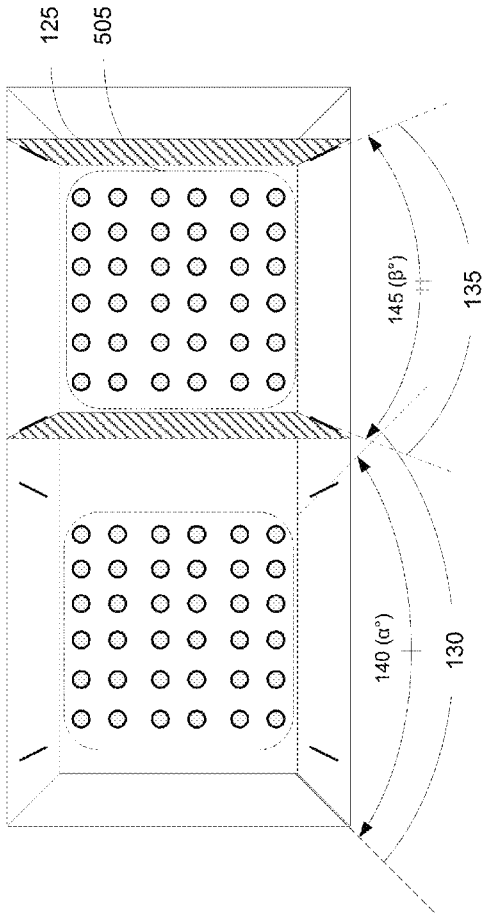

FIG 5B

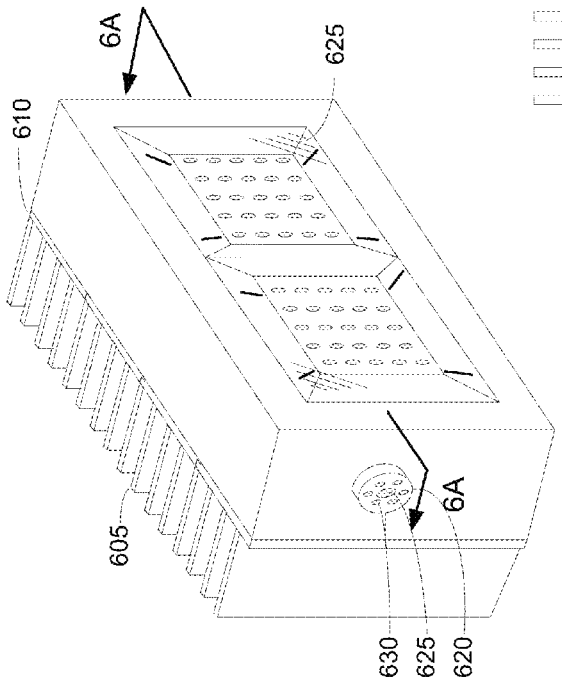
6A
625
610
605
6A
630
625
620

FIG 6

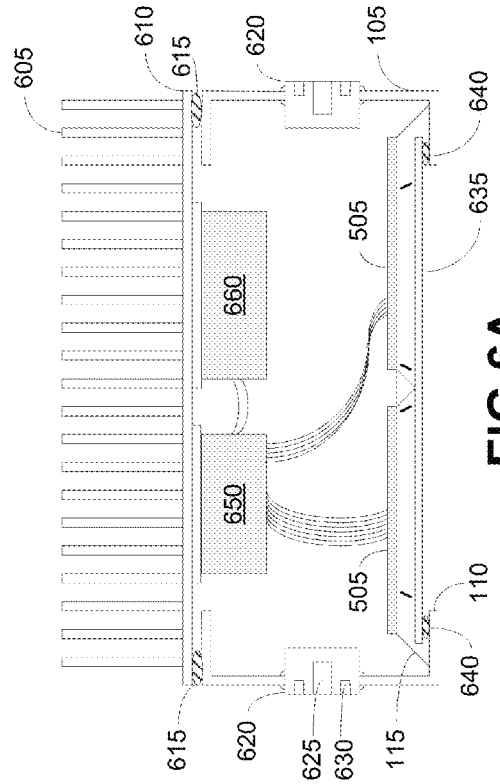
605
610
615
620
105
640
635
505
660
650
505
110
640
615
620
625
630
115

FIG 6A

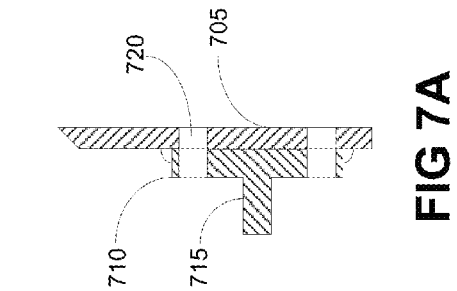

FIG 7A

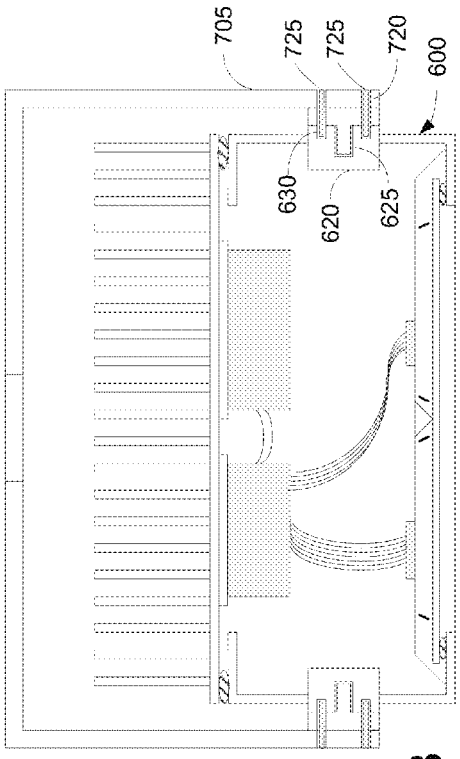

FIG 7B

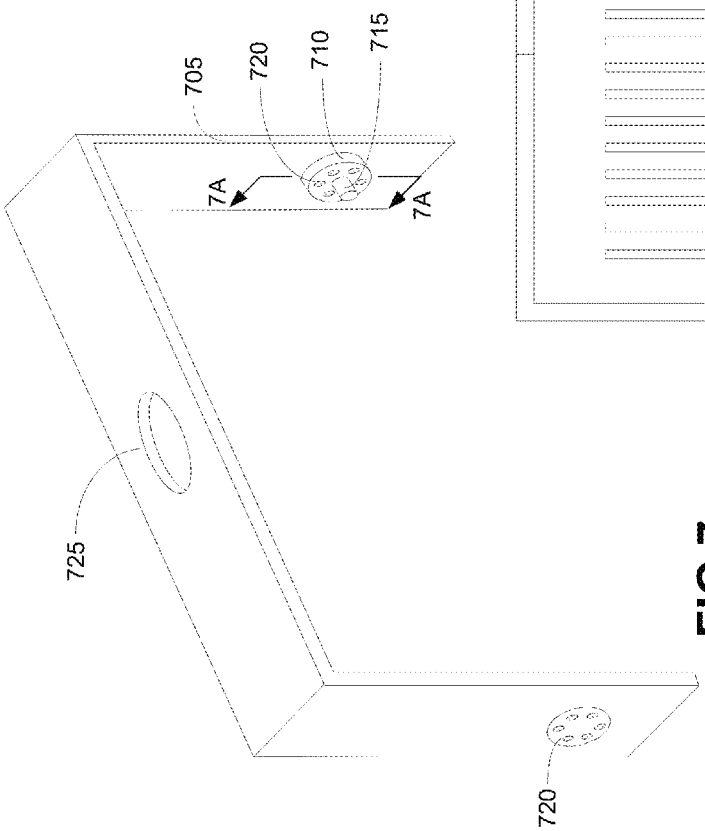

FIG 7

MARINE LIGHT FIXTURE

BACKGROUND

1. Technical Field

This disclosure generally relates to lighting fixtures and particularly relates to marine lighting fixtures.

2. Description of the Related Art

Lighting systems are used in a wide variety of applications and environments. Some environments may be particularly harsh. For example, marine environments may expose a lighting system to corrosion from water, to high winds, and other operational stresses.

Marine lighting systems are used on both recreational and commercial vessels. Lighting requirements vary by service, application, and user, at times requiring a floodlight able to provide broad illumination of an area and at other times requiring the precision of a spotlight able to provide focused illumination at a specific location. Limited shipboard power can restrict the size and number of lighting fixtures that can be safely accommodated. Limited shipboard real estate places a premium on the size and utility of a marine light fixture, thus the ability to physically mount multiple lighting fixtures may not exist. Due to space constraints or operational requirements, marine lighting fixtures may be mounted in unusual configurations, at times on structures not originally intended for use as a lighting stand.

In addition to inherent shipboard physical and electrical limitations, marine light fixtures must also endure harsh operating conditions including extremes of heat, moisture, and vibration. Such operational demands increase the likelihood of failure of electronics within the light fixture. Rigorous service conditions, limited availability of shipboard space and/or resources, and wide variability in user requirements place challenging demands on marine light fixtures. Thus, a configurable marine light fixture having a flexible mounting system, and acceptable water-resistance and anti-fog characteristics is desirable.

BRIEF SUMMARY

A light fixture may be summarized as including a housing having an interior separated by the housing from an exterior ambient environment, the housing having at least one opening between the interior and the exterior ambient environment; and at least one reflector at least partially received by the housing and which has a first and a second configurable throw pattern that extends outwardly from the at least one opening, the configurable throw patterns having respective ones of at least one subtended angle, the at least one reflector having a number of coupling features to selectively install, after manufacture of the light fixture, at least one reflective throw pattern adjustment member, a first one of the subtended angles of the first configurable throw pattern has a first value when the reflective throw pattern adjustment member is not installed and the first one of the subtended angles of the first configurable throw pattern has a second value after the reflective throw pattern adjustment member is installed, the second value of the first one of the subtended angles different from the first value of the first one of the subtended angles.

A first one of the subtended angles of the second configurable throw pattern may have a first value when the reflective throw pattern adjustment member is not installed and the first one of the subtended angles of the second configurable throw pattern may have a second value after the reflective throw pattern adjustment member is installed, the second value of the first one of the subtended angles different from the first value of the first one of the subtended angles. A first one of the subtended angles of the second configurable throw pattern may have a first value when the reflective throw pattern adjustment member is not installed, the first value of the first one of the subtended angles of the second configurable throw pattern approximately the same as the first value of the first one of the subtended angles of the first configurable throw pattern. The at least one reflector may include a first reflector and a second reflector mounted in a side by side relationship to the housing, and may further include a first solid state light source positioned with respect to the first reflector such that the first reflector reflects at least a portion of the light emitted by the first solid state light source in the first configurable throw pattern; and a second solid state light source positioned with respect to the second reflector such that the second reflector reflects at least a portion of the light emitted by the second solid state light source in the first configurable throw pattern. The first and the second reflector may each have at least four reflective sides which include a first pair of opposed reflective sides and a second pair of opposed reflective sides, the reflective sides of each of the first and the second pairs of reflective sides angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment. The at least one reflective throw pattern adjustment member may include at least a first and a second reflective throw pattern adjustment member and the number of coupling features may include a first pair of slots in respective ones of the first pair of opposed reflective sides of the first and second reflectors and a second pair of slots in respective ones of the first pair of opposed reflective sides of the first and second reflectors, the second pair of slots spaced laterally across the first reflector from the first pair of slots, the first and the second pair of slots sized and dimensioned to securely receive respective ones of the first and the second reflective throw pattern adjustment members. The slots in the first one of the reflective sides of the first opposed pair of reflective sides may be angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment, and the slots in the first one of the reflective sides of the second opposed pair of reflective sides may be angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment. An angle between the slots in the first one of the reflective sides of the first pair of opposed reflective sides may be different than an angle between the slots in the first one of the reflective sides of the second pair of opposed reflective sides. The at least one reflector may consist of a single reflector having four reflective sides which include a first pair of opposed reflective sides and a second pair of opposed reflective sides, the reflective sides of each of the first and the second pairs of reflective sides angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment. The at least one reflective throw pattern adjustment member may include at least a first and a second reflective throw pattern adjustment member and the number of coupling features may include a first pair of slots in the first pair of opposed reflective sides and a second pair of slots in respective ones of the first pair of opposed reflective sides, the second pair of slots spaced laterally across the first reflector from the first pair of slots, the first and the second pair of slots sized and dimensioned to securely, removably, receive respective ones of the first and the second reflective throw pattern adjustment members. The light fixture may further include at least one keyed rotary adjuster coupled to the housing to rotate the housing about at least one axis, the keyed rotary adjuster including a central cavity to accept the insertion of a shaft, surrounded by a plurality of peripheral cavities

to accept the insertion of a key member to fix the housing at a fixed angle of rotation about the shaft. The housing may include an exterior surface and the at least one keyed rotary adjuster may be affixed to the exterior surface of the housing. The housing may include an interior surface and the at least one keyed rotary adjuster may be at least partially affixed to the interior surface of the housing and accessible from outside of the housing. The light fixture may further include a transparent member received into the opening of the housing, the transparent member coupled at least in part to the housing by a thermally conductive sealant material disposed at least partially between the transparent member and the housing to seal the opening and conductively transfer heat between the housing and the transparent member. The light fixture may further include a heat transfer member at least partially coupled to the housing at least in part by a thermally conductive material disposed at least partially between the heat transfer member and the housing to conductively transfer heat from the housing to the heat transfer member.

A light fixture may be summarized as including a housing having an interior separated by the housing from an exterior ambient environment, the housing having at least one opening between the interior and the exterior ambient environment; at least one reflector at least partially received by the housing and which has a first and a second configurable throw pattern that extends outwardly from the at least one opening, the configurable throw patterns having respective ones of at least one subtended angle, the at least one reflector having a number of coupling features to selectively install, after manufacture of the light fixture, at least one reflective throw pattern adjustment member, a first one of the subtended angles of the configurable first throw pattern has a first value when the reflective throw pattern adjustment member is not installed and the first one of the subtended angles of the first configurable throw pattern has a second value after the reflective throw pattern adjustment member is installed, the second value of the first one of the subtended angles different from the first value of the first one of the subtended angles; a plurality of keyed rotary adjusters, coupled to the housing to rotate the housing about at least one axis, each of the plurality of keyed rotary adjusters including a central cavity to accept the insertion of a shaft, surrounded by a plurality of peripheral cavities to accept the insertion of a key member to fix the housing at an angle of rotation about the shaft; and a transparent member received into the opening of the housing, the transparent member coupled at least in part to the housing by a thermally conductive sealant material disposed at least partially between the transparent member and the housing to seal the opening and conductively transfer heat between the housing and the transparent member.

The light fixture may further include a mounting member couplable to the plurality of keyed rotary adjusters, the mounting member including: at least one shaft insertable within the central cavity of at least a portion of the plurality of keyed rotary adjusters; at least one key member insertable within at least one of the peripheral cavities of at least a portion of the plurality of keyed rotary adjusters; and at least one mounting fixture to attach the mounting member and housing to an external structure. The housing may have an exterior surface and at least a portion of the plurality of keyed rotary adjusters may be affixed to the exterior surface of the housing. The housing may have an interior surface and at least a portion of the plurality of keyed rotary adjusters may be affixed at least partially to the interior surface of the housing in a location accessible from outside the housing. The at least one reflector may include a first reflector and a second reflector mounted in a side by side relationship to the housing, and may further include a first solid state light source positioned with respect to the first reflector such that the first reflector reflects at least a portion of the light emitted by the first solid state light source in the first configurable throw pattern; and a second solid state light source positioned with respect to the second reflector such that the second reflector reflects at least a portion of the light emitted by the second solid state light source in the first configurable throw pattern.

A light fixture may be summarized as including a housing having an interior separated by the housing from an exterior ambient environment, the housing having at least one opening between the interior and the exterior ambient environment; at least two reflectors in a side-by-side tandem arrangement, the at least two reflectors at least partially received by the housing, each of the reflectors includes at least a first pair and a second pair of laterally opposed reflective sides angling outward from the reflector and extending towards the at least one opening, each of the at least two reflectors has a first and a second configurable throw pattern that extends outwardly from the reflector, each of the first and second configurable throw patterns having respective ones of at least one subtended angle; a first pair and a second pair of slots, each pair of slots symmetrically disposed on the first pair of laterally opposed reflective sides of each reflector, each pair of slots to selectively accept, after manufacture of the light fixture, at least one reflective throw pattern adjustment member, a first one of the subtended angles of the configurable first throw pattern has a first value when the at least one reflective throw pattern adjustment member is not installed and the first one of the subtended angles of the first configurable throw pattern has a second value after the at least one reflective throw pattern adjustment member is installed, the second value of the first one of the subtended angles different from the first value of the first one of the subtended angles; a plurality of keyed rotary adjusters, coupled to the housing to rotate the housing about at least one axis, each of the plurality of keyed rotary adjusters including a central cavity to accept the insertion of a shaft, surrounded by a plurality of peripheral cavities to accept the insertion of a key member to fix the housing at an angle of rotation about the shaft; a heat transfer member at least partially coupled to the housing by a thermally conductive material disposed at least partially between the heat transfer member and the housing to conductively transfer heat from the housing to the heat transfer member; and an at least partially transparent member received into the opening of the housing, the at least partially transparent member coupled at least in part to the housing by a thermally conductive sealant material to seal the opening and conductively transfer heat between the housing and the at least partially transparent member.

The light fixture may further include a first solid state light source positioned with respect to the first reflector such that the first reflector reflects at least a portion of the light emitted by the first solid state light source in the first configurable throw pattern; and a second solid state light source positioned with respect to the second reflector such that the second reflector reflects at least a portion of the light emitted by the second solid state light source in the first configurable throw pattern.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

In the drawings, identical reference numbers identify similar elements or acts. The sizes and relative positions of elements in the drawings are not necessarily drawn to scale. For example, the shapes of various elements and angles are not

drawn to scale, and some of these elements are arbitrarily enlarged and positioned to improve drawing legibility. Further, the particular shapes of the elements as drawn are not intended to convey any information regarding the actual shape of the particular elements, and have been solely selected for ease of recognition in the drawings.

FIG. **1**A is an orthogonal view of a lighting fixture including a housing and a reflector having configurable first and second throw patterns and a number of coupling features, according to one illustrated embodiment.

FIG. **1**B is an orthogonal view of the lighting fixture depicted in FIG. **1**A, including a number of reflective throw pattern adjustment members coupled to a portion of the coupling features, according to one illustrated embodiment.

FIG. **2**A is a plan view of two broad beam throw patterns provided by the lighting fixture depicted in FIG. **1**A, according to one illustrated embodiment.

FIG. **2**B is a plan view of a single broad beam throw pattern and a single narrow beam throw pattern provided by the lighting fixture depicted in FIG. **1**B, according to one illustrated embodiment.

FIG. **3**A is an orthogonal view of a lighting fixture including a housing and a reflector including two side-by-side reflectors, each having configurable first and second throw patterns and a number of coupling features, according to one illustrated embodiment.

FIG. **3**B is an orthogonal view of the lighting fixture depicted in FIG. **3**A including a number of reflective throw pattern adjustment members coupled to a portion of the coupling features in one of the two side-by-side reflectors, according to one illustrated embodiment.

FIG. **4**A is a plan view of two broad beam throw patterns provided by the lighting fixture depicted in FIG. **3**A, according to one illustrated embodiment.

FIG. **4**B is a plan view of a single broad beam throw pattern and a single narrow beam throw pattern provided by the lighting fixture depicted in FIG. **3**B, according to one illustrated embodiment.

FIG. **5**A is an elevation view of a solid state light source disposed within the reflector having configurable first and second throw patterns and a number of coupling features as depicted in FIG. **1**A, according to one illustrated embodiment.

FIG. **5**B is an elevation view of a solid state light source disposed within the reflector having configurable first and second throw patterns and including a number of reflective throw pattern adjustment members coupled to a portion of the coupling features as depicted in FIG. **1**B, according to one illustrated embodiment.

FIG. **6** is an orthogonal view of a lighting fixture including a reflector having two side-by-side reflectors, a heat transfer member, and at least one rotary keyed adjuster, according to one illustrated embodiment.

FIG. **6**A is a sectional view of the light fixture depicted in FIG. **6**, including the thermally conductive material disposed between the heat transfer member and the housing, the thermally conductive sealant material disposed between an at least partially transparent member and the housing, a plurality of rotary keyed adjusters, a power supply and a lighting controller, according to one illustrated embodiment.

FIG. **7** is an orthogonal view of a mounting member complimentary with and couplable to the plurality of keyed rotary adjusters on the lighting fixture, according to one illustrated embodiment.

FIG. **7**A is a sectional view of the complimentary keyed rotary adjuster on the mounting member, including a shaft and peripheral cavities to accept the insertion of a key member, according to one illustrated embodiment.

FIG. **7**B is a sectional plan view of the mounting member coupled to the light fixture depicted in FIG. **7**, according to one illustrated embodiment.

DETAILED DESCRIPTION

In the following description, certain specific details are set forth in order to provide a thorough understanding of various disclosed embodiments. However, one skilled in the relevant art will recognize that embodiments may be practiced without one or more of these specific details, or with other methods, components, materials, etc. In other instances, well-known structures associated with computing systems including client and server computing systems, broadcast systems including radio and television broadcast systems, as well as networks and other communications channels have not been shown or described in detail to avoid unnecessarily obscuring descriptions of the embodiments.

Unless the context requires otherwise, throughout the specification and claims which follow, the word "comprise" and variations thereof, such as, "comprises" and "comprising" are to be construed in an open, inclusive sense, that is, as "including, but not limited to."

Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, the appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

As used in this specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the content clearly dictates otherwise. It should also be noted that the term "or" is generally employed in its sense including "and/or" unless the content clearly dictates otherwise.

The headings and Abstract of the Disclosure provided herein are for convenience only and do not interpret the scope or meaning of the embodiments.

FIGS. **1**A and **1**B depict an example lighting fixture **100** including a housing **105** having at least one opening **110**, and a reflector **115** mounted at least partially within an interior space of the housing **105**. The reflector **115** can have any physical orientation or geometry, including shapes and configurations other than the illustrative prismatic reflector depicted in FIG. **1**A. The reflector **115** provides multiple configurable throw patterns **130**, **135** exiting the housing via the at least one opening **110**. The multiple configurable throw patterns include at least two patterns **130**, **135**, and may include a greater number of throw patterns, all at least partially exiting from the at least one opening **110**. The ability to generate multiple configurable throw patterns **130**, **135** within a single housing provides operational flexibility, for instance the ability to generate two differing throw patterns such as a broad-beam floodlight and a narrow-beam spotlight using the same light fixture **100**.

A number of coupling features **120** are disposed about the reflector **115**. The coupling features **120** permit the temporary or permanent attachment of at least one reflective throw pattern adjustment member **125**, each coupled to at least one of the coupling features **120** disposed about the reflector **115**. A variety of physical shapes and configurations can be used to

couple the reflective throw pattern adjustment members **125** to the coupling features **120**. In some instances, the coupling features **120** can include a plurality of slots disposed about the reflector **115** and can include a complimentary tab or edge insertable into one of the slots forming the coupling features **120**. In other instances, each of the reflective throw pattern adjustment members **125**, may be sized and dimensioned to result in an interference fit. In yet other instances, the coupling features **120** can include a plurality of slots disposed about the reflector **115** to which each of the reflective throw pattern adjustment members **125** can be permanently affixed, for example, through the use of an adhesive or similar material.

The light fixture in FIG. **1**A is depicted without the reflective throw pattern adjustment members **125** coupled to the coupling features **120**. In the absence of the reflective throw pattern adjustment members **125**, the lighting fixture will provide a throw pattern based upon the geometry of the reflector **115** and the size, location and number of light sources disposed proximate the reflector **115**. In some instances, for example, where two similarly sized and placed light sources are proximate a symmetric or uniform reflector **115**, the light fixture depicted in FIG. **1**A provides two similarly configured throw patterns **130**, **135**, each having a similar subtended angle **140** with a first value a°.

In other instances, for example, as depicted in FIG. **1**B, one or more reflective throw pattern adjustment members **125** may be disposed proximate the reflector **115** to alter or change the geometry or reflective characteristics of all or a portion of the reflector **115**. For example, two throw pattern adjustment members **125** are shown coupled to the light fixture **100** in FIG. **1**B. The presence of the throw pattern adjustment members **125** alters the geometry of the reflector **115** such that even with similarly sized and placed light sources proximate the reflector **115**, each of the throw patterns **130**, **135** has a different subtended angle. The first throw pattern **130** has a subtended angle **140** with a first value of $\alpha°$, while the second throw pattern **135** has a reduced subtended angle **145** with a second value of $\beta°$.

The reflector **115** may provide more than two different subtended angles **140**, **145**, for example, through the use of a plurality of coupling features **120** disposed at differing angles measured with respect to the light source, the reflector **115**, or both the light source and the reflector **115**. An example may be the use of slotted coupling features **120** disposed at three different angles, such as 60°, 70°, and 80°, measured with respect to the light source or the reflector **115**.

The housing **105** can include a metallic or non-metallic structure capable of providing support and physical protection of the reflector **115**. Although only a single opening **110** is depicted in FIGS. **1**A and **1**B, any number of openings **110** can be symmetrically or asymmetrically arranged on or about the housing **105**. For example, a second opening may be present opposite the opening **110** to facilitate the installation of the reflector **115**. Other smaller openings may be present in the housing **105**, for example, to provide access to one or more mounting or support devices intended to mount the lighting fixture **100** to a surface or other structure.

The housing **105** may have any shape, size, or configuration dependent at least in part upon the type of the reflector **115**, light source, power supply and controller placed at least partially within the housing. When the lighting fixture **100** is intended for use in a shipboard environment where space is at a premium, smaller housings, for example, a housing measuring about 12.25 inches wide by about 7.50 inches high, by about 3.6 inches deep may be used.

To provide adequate strength and corrosion resistance, particularly in a marine environment, the housing **105** may be fabricated in whole or in part from aluminum or an aluminum alloy such as marine grade aluminum alloys 5083 or 6061. In some embodiments, the housing **105** may be fabricated from sheet aluminum that is cut, bent and assembled to form the housing **105**. In other embodiments, the housing **105** may be fabricated from individual pieces of ¼" to ½" thick aluminum plate that are welded or otherwise chemically or thermally fused together to provide the housing **105**. In other embodiments, the housing **105** may be fabricated using an aluminum shape, for example, a square tube, which is cut, bent, and assembled to form the housing **105**. To provide additional structural strength to the housing **105** one or more internal or external frames, support members, gussets, or the like may be used.

The use of various heat producing elements such as power supplies, lighting controllers, and light sources within the housing **105** creates heat within the housing **105**. The ability to remove or convey this heat to the exterior ambient environment about the housing **105** may assist in limiting or otherwise controlling the heat within the housing **105** thereby improving the performance or extending the life of the light sources and/or electronics. The use of thermally conductive metallic or non-metallic materials, such as the aforementioned aluminum **5083** or **6161** alloys may facilitate convective heat transfer from within the housing **105** to the surrounding ambient environment.

A surface treatment may be applied to the interior surfaces, exterior surfaces, or both interior and exterior surfaces of the housing **105**. Surface treatments may be applied to the housing **105** for decorative purposes, to improve corrosion resistance, to improve thermal performance, or any combination thereof. Surface treatments may include the application of surface coatings such as powder coatings; chemical coatings such as anodization; or metallic coatings such as electroless nickel plating.

The at least one opening **110** in the housing **105**, although depicted as a rectangular opening in FIGS. **1**A and **1**B, may be of any size or shape necessary to accommodate the first and second configurable throw patterns **130**, **135** and the reflector **115**. For example, if a dished or parabolic reflector **115** is used, the at least one opening **110** can have a circular, oval, or rounded corner rectangular configuration. The opening **110** can have any physical dimensions, limited only by the physical size of the housing **105** and the size and shape of the at least first and second configurable throw patterns **130**, **135** that pass through the opening **110**. In some embodiments, one or more crossbars across the opening **110** may be employed to provide structural support or strength for the housing **105**. When the lighting fixture **100** is intended for use in a shipboard environment where space is at a premium, smaller housings **105** may limit the size of the opening **110**, for example, limiting the opening size to about 10.50 inches wide by about 2.50 inches high. A structural element, for example, a recess, a flange, or similar detent to facilitate the attachment of a member partially or completely covering the opening **110** can extend about all or a portion of the interior or exterior perimeter of the opening **110**.

In some embodiments, a rectangular, angled reflector **115** as depicted in FIGS. **1**A and **1**B may be used. The rectangular, angled reflector **115** may incorporate a relatively flat back plane with at least four outwardly angled sides. Although a rectangular, angled reflector **115** is depicted in FIGS. **1**A and **1**B, the reflector **115** may have any size, shape, or geometry necessary to achieve at least the first and second configurable throw patterns **130**, **135**. The first and second configurable

throw patterns **130**, **135** are independently configurable such that each provides at least two subtended angles **140**, **145** dependent upon the size and number of any reflective throw pattern adjustment members **125** coupled to the coupling features **120** disposed about the reflector **115**.

The reflector **115** may incorporate metallic, non-metallic, or any combination of metallic and non-metallic reflective surfaces to achieve at least the first and second configurable throw patterns **130**, **135**. The materials used to provide the reflective surfaces of reflector **115** can be surface treated or otherwise coated to improve performance, reflectivity, durability, or any combination thereof. For example, anodized reflective aluminum may be used to provide a resilient, durable, reflective surface on all or a portion of the reflector **115**.

The reflector **115** may be temporarily or permanently attached or otherwise affixed to the housing **105** proximate all or a portion of the opening **110**. In some instances, mechanical fasteners such as screws, ¼-turn (e.g., Dzus) fasteners, or similar threaded devices may be used to permanently or temporarily attach the reflector **115** to the housing **105**. In other instances, chemical adhesives such as epoxies or similar compounds may be used to permanently or temporarily attach the reflector **115** to the housing **105**. A sealant such as a silicone sealant may be disposed about all or a portion of the reflector **115** to minimize the likelihood of fluid intrusion into the housing **105**. In some embodiments, a thermally conductive fastener, sealant, material, or any combination thereof may be used to thermally couple or otherwise attach the reflector **115** to the housing **105**. Thermally coupling the reflector **115** to the housing **105** can permit conductive heat transfer from the reflector **115** to the housing **105**, thereby minimizing the temperature rise experienced by the reflector **115** during operation of the light fixture **100**.

A number of coupling features **120** permitting the temporary or permanent attachment of at least one reflective throw pattern adjustment member **125** are disposed about the reflector **115**. Disposing the coupling features **120** in locations accessible after manufacture of the light fixture **100**, provides post-manufacture flexibility in tailoring the configuration of the first and second configurable throw patterns **130**, **135**, for example, by providing a combination of wide and narrow beam throw patterns **130**, **135**. Although depicted about the perimeter of the reflector **115** in FIGS. **1**A and **1**B, all or a portion of the coupling features **120** may be physically located in whole or in part on the reflector **115**, on the housing **105**, or any combination of the reflector **115** and the housing **105**.

Where the reflector **115** includes a number of angled sides such as depicted in FIGS. **1**A and **1**B, at least a portion of the coupling features **120** may be placed or otherwise disposed on or about the angled sides of the reflector **115**. Although the coupling features **120** are depicted as a series of slots in FIGS. **1**A and **1**B, any exposed, surface, or recessed coupling feature **120** enabling the attachment of the at least one reflective throw pattern adjustment member **125** may be used either alone or in conjunction with other coupling features **120**. For example, the coupling features **120** can include any number of recesses, cavities, pockets, detents, appurtenances, or combinations thereof.

In some instances, multiple coupling features **120** may be disposed about all or a portion of the reflector **115**. The multiple coupling features **120** can include, for example, a plurality of slots disposed at differing angles measured with respect to the visible light source or reflector **115** as depicted in FIGS. **1**A and **1**B. Making the coupling features **120** accessible after manufacture permits flexibility in user configuration of the light fixture **100** by allowing the coupling of the at least one reflective throw pattern adjustment member **125** in different locations as needed to provide first and second configurable throw patterns **130**, **135** having the same or different subtended angles **140**, **145**.

The reflective throw pattern adjustment members **125** can include any structure having a partially or completely reflective surface capable of affecting the physical or optical characteristics of the first and second configurable throw patterns **130**, **135**. The throw pattern adjustment members **125** may be installed either at the time of manufacture or subsequent to the manufacture of the light fixture **100**. The ability to couple the reflective throw pattern adjustment members **125** post-manufacture of the light fixture **100** provides the opportunity to customize the configuration of the light fixture, enabling each of the throw patterns **130**, **135** to have the same or different subtended angles **140**, **145**. For example, the first configurable throw pattern **130** with no reflective throw pattern adjustment members **125** installed has a subtended angle **140** with a first value of α° corresponding to a floodlight, while the second configurable throw pattern **135** with two reflective throw pattern adjustment members **125** has a subtended angle **145** with a second value of β° corresponding to a spotlight.

The reflective throw pattern adjustment members **125** may include any metallic, non-metallic, or combination of metallic and non-metallic materials capable of providing a reflective surface suitable for adjusting the subtended angle **140** of the first or second configurable throw patterns. All or a portion of the reflective throw pattern adjustment members **125** can have any shape, size or configuration necessary to engage with or attach to the coupling features **120**—non-limiting examples include: blade shaped members, airfoil shaped members, and triangular members.

In some instances, the coupling features **120** may be disposed at a fixed angle with respect to the face of the visible light source or reflector **115**. Where the coupling features **120** are disposed at a fixed angle, all or a portion of the reflective throw pattern adjustment members **125** may be offset or disposed at an angle with respect to the coupling features **120** to provide variable throw patterns each having various different subtended angles.

Installing the reflective throw pattern adjustment members **125** after manufacture of the light fixture **100** includes engaging or coupling a feature on the reflective throw pattern adjustment members **125** with the appropriate coupling feature **120**. In some instances, the coupling of the reflective throw pattern adjustment members **125** with the appropriate coupling feature **120** may include sliding the adjustment member **125** into a slotted coupling feature **120**. In other instances, the coupling of the adjustment member **125** may include flexing the adjustment member **125** such that tabs on the ends of the adjustment member **125** "spring" into a slotted coupling feature **120**. In yet other instances, the coupling of the adjustment member **125** may include the installation of one or more fasteners or adhesives either on the face or the reverse side of the reflector **115** to secure the adjustment member **125** in place.

FIG. **2**A shows a dual broad beam throw pattern. FIG. **2**B shows a single broad beam and a single narrow beam throw pattern. The throw patterns depicted in FIGS. **2**A and **2**B correspond to the light fixture configurations depicted in FIGS. **1**A and **1**B, respectively.

The dual broad beam throw pattern in FIG. **2**A depicts a configuration having no installed reflective throw pattern adjustment members **125**. In such a configuration, the first configurable throw pattern **130** and the second configurable throw pattern **135** will be similar. With comparably posi-

tioned and illuminated light sources and a symmetric reflector **115** design, the subtended angle **140** of each the first throw pattern **130** and the second throw pattern **135** will be similar, having a first value of α° in the example depicted in FIG. **2**A. Although not depicted in FIG. **2**A, an asymmetric reflector **115** design may cause the first configurable throw pattern **130** and the second throw pattern **135** to have differing subtended angles.

The single broad beam and a single narrow beam throw pattern in FIG. **2**B depicts a configuration where reflective throw pattern adjustment members **125** have been coupled to the portion of the reflector **115** providing the second throw pattern **135**. The first configurable throw pattern **130**, unaffected by the installation of the reflective throw pattern adjustment members **125**, retains a broad throw pattern with a relatively wide subtended angle **140** having a first value of α°. The installation of the reflective throw pattern adjustment members **125** in the second configurable throw pattern **135** however, reduces the subtended angle **145** to provide a tighter, more focused throw pattern having a second value of β°, where α° and β° are different angles.

Although illustrated using a reflector **115** having only first and second configurable throw patterns **130**, **135**, a reflector **115** having any number of throw patterns may be similarly employed, for example, by providing an appropriate number of coupling features **120** for each of the throw patterns provided by the reflector **115**. Where the reflector **115** provides three or more throw patterns, each throw pattern may be independently configured after manufacture of the light fixture **100** to have the same or different subtended angles dependent upon the number and location of reflective throw pattern adjustment members **125** coupled to the coupling features **120**.

FIGS. **3**A and **3**B show a light fixture **300** having a reflector **115** divided by a reflective member **305** to provide two side-by-side reflectors **310** and **315**. Similar to the reflector **115** discussed previously, the first and second configurable throw patterns **130**, **135** of each of the side by side reflectors **310**, **315** are independently configurable by coupling one or more reflective throw pattern adjustment members **125** with at least a portion of the coupling features **120**.

The lighting fixture **300** in FIG. **3**A is depicted without reflective throw pattern adjustment members **125** to provide configurable throw patterns **130**, **135** each having a similar subtended angle **140** with a first value of α°. The lighting fixture **300** depicted in FIG. **3**B is depicted with reflective throw pattern adjustment members **125** proximate reflector **315** generating a second configurable throw pattern **135** having a relatively smaller subtended angle **145** with a second value of β°.

FIG. **4**A shows a dual broad beam throw pattern. FIG. **4**B shows a single broad beam and a single narrow beam throw pattern. The throw patterns depicted in FIGS. **4**A and **4**B correspond to the light fixture **300** configurations depicted in FIGS. **3**A and **3**B, respectively.

The dual broad beam throw pattern in FIG. **4**A depicts a light fixture **300** without installed reflective throw pattern adjustment members **125**. In such a configuration, the first throw pattern **130** and the second throw pattern **135** are similar. Based upon a the symmetry of reflectors **310** and **315**, the subtended angle **140** of each the first throw pattern **130** and the second throw pattern **135** will be similar, having a first value of a° in the example depicted in FIG. **4**A. Although not depicted in FIG. **4**A, should the reflectors **310** and **315** be asymmetrically configured, the first configurable throw pattern **130** and the second configurable throw pattern **135** may have differing subtended angles.

The single broad beam and a single narrow beam throw pattern in FIG. **4**B depicts a configuration where reflective throw pattern adjustment members **125** have been coupled to the portion of reflector **315** providing the second throw pattern **135**. The first throw pattern **130**, unaffected by the installation of the reflective throw pattern adjustment members **125**, retains a broad throw pattern with the relatively wide subtended angle **140** having a first value of α°. The installation of the reflective throw pattern adjustment members **125** proximate the reflector **315** however, reduces the subtended angle **145** of the second throw pattern **135**, providing a tighter, more focused throw pattern with a smaller subtended angle **145** having a second value of β°, where α° and β° are different angles.

Although illustrated using a reflector **115** divided using a single reflective member **305** to provide only the first and second reflectors **310**, **315**, a reflector **115** having any number of configurable throw patterns may be similarly employed by disposing additional reflective members **305** at desired intervals across the reflector **115**. For example, the use of two reflective members **305** with coupling features proximate each of the reflectors would provide three separate, distinct, independently configurable throw patterns. Where three or more throw patterns are provided, each may be independently configured after manufacture of the light fixture **100** to have different subtended angles dependent upon the number and location of reflective throw pattern adjustment members **125** coupled to the reflector **115**.

FIGS. **5**A and **5**B show example solid state light source **505** useful, for example, in light fixtures **100** and **300** depicted in FIGS. **1**A, **1**B and **3**A, **3**B, respectively. The solid state light source **505** can have one or more independent light sources, each comprising one or more individual lights or illuminators **510**. The individual lights **510** forming the solid state light source **510** can be arranged or configured in any random or structured pattern, such as the illustrative grid pattern depicted in FIGS. **5**A and **5**B. The use of one or more patterns of individual lights **510** to form the solid state light source **505** may produce desirable beam characteristics, for example, a region of greater intensity within the beam. In some instances, the solid state light source **505** can be disposed in whole or in part at one or more focal points of the reflector **115**. For example, as depicted in FIGS. **5**A and **5**B, a planar solid state light source **505** may be arranged coplanar with all or a portion of the reflector **115**. The solid state light source **505** may be partially or completely sealed against water intrusion, dust intrusion, or both water and dust intrusion.

The solid state light source **505** may be, for example, a light emitting diode (LED) based light source. A non-limiting example solid state light source **505** is the XLM 8030/8040 series LED module manufactured by XICATO®. The output of the solid state light source **505** may vary based upon the available power and/or operational demands placed upon the light fixture **100**. The luminous flux of the solid state light source **505** can be about 2000 lumens or greater; about 3000 lumens or greater; about 4000 lumens or greater; or about 5000 lumens or greater. The color value or temperature of the light source may be based at least in part upon the operational demands placed upon the light fixture **100**.

The intensity of the solid state light source **505** may be fixed or variable, for example, a variable intensity solid state light source **505** may be useful as a narrow beam throw spotlight since the desired throw distance of the spotlight can vary with the operational demands placed upon the spotlight. Similarly, a variable intensity solid state light source **505** may be useful as a wide beam throw floodlight since environmen-

tal conditions such as rain, snow, or water spray may require greater light intensity to provide adequate lighting.

The solid state light source **505** can be mounted in whole or in part within the housing **105**. In some instances, the solid state light source **505** is attached directly to the reflector **115**. In other instances, the solid state light source **505** is attached to the housing **105** or to a removable cover attachable to the housing **105**. Placing the solid state light source **505** on a removable or detachable member improves maintenance access and permits replacement of the solid state light source **505**.

FIG. **6** shows a light fixture **600** including a reflector having two side-by-side reflectors **310**, **315**, a heat transfer member **605**, and at least one rotary keyed adjuster **620**, according to one illustrated embodiment. FIG. **6**A shows the light fixture **600** along sectional line **6**A-**6**A depicting various internal features including an at least partially transparent member **635**, and thermally conductive sealant material **640**. A solid state light controller **650** and a power converter **660** are depicted as attached to an interior surface of a cover member **610**.

Several heat sources including the solid state light controller **650** and power supply **660** are disposed at least partially within the housing **105**. Any or all of these elements may individually or collectively generate undesirable levels of heat within the light fixture **600** when in operation. To improve the convective heat transfer properties of the light fixture **600**, a heat transfer member **605** is used to convey heat from the interior of the housing **105** to the ambient exterior environment surrounding the housing **105**. In at least some instances, the heat transfer member **605** includes an extended surface heat sink such as the finned heat sink depicted in FIG. **6**.

The heat transfer member **605** can include or be integral with all or a portion of the cover member **610**. The cover member **610** can be attached permanently or temporarily to the housing **105**, for example, covering an aperture disposed on a portion of the housing **105**. The cover member **610** can be coupled or otherwise attached to the housing **105** using one or more mechanical fasteners (e.g., threaded fasteners such as screw or quarter-turn fasteners), chemical adhesives, or any combination thereof. Where the cover member **610** is a physically distinct component coupled or attached to the housing **105**, a thermally conductive sealant material **615** may be disposed at least partially between the housing **105** and the cover member **610**. The presence of the thermally conductive sealant material **615** between the housing and the cover member facilitates in the conductive transfer of heat from the housing **105** to the heat transfer member **605** and to the exterior ambient environment surrounding the light fixture **600**. The presence of the thermally conductive sealant material **615** between the housing **105** and the cover member **610** also assists in preventing water intrusion or leakage along the joint formed by the intersection of the cover member **610** and housing **105**.

In some instances the heat transfer member **605** is an extended surface, finned or pinned, heat sink formed integrally with the cover member **610**, for example, an extruded aluminum finned heat sink formed integral with the cover member **610**, such as the light fixture **600** depicted in FIGS. **6** and **6**A. In other instances, the heat transfer member **605** is a physically distinct structure that is physically and thermally coupled to the cover member **610** via a thermally conductive mechanical coupling (e.g., mechanical fasteners used with a thermally conductive sealant material) or a thermally fused coupling (e.g., a thermally conductive metallic weld between the heat transfer member **605** and the cover member **610**).

The cover member **610** may be used to provide a mounting surface for the solid state light source **505**, the solid state light controller **650**, the power converter **660**, or any combination thereof. Some or all of the components physically coupled to the cover member **610** may also be thermally coupled to the cover member **610** to facilitate the flow of heat from the components to the heat transfer member **605** coupled to the cover member **610**. The mating surfaces of the cover member **610**, the surfaces that come into contact with and form the joint between the cover member **610** and the housing **105** may be machined or otherwise mechanically or chemically finished to provide a relatively smooth sealing surface.

The thermally conductive sealant material **615** includes any material permitting the flow of heat between two surfaces disposed on either side of the material. A silicon or polyurethane carrier impregnated with thermally conductive particles such as aluminum particles provides an example thermally conductive sealant material **615**. Example polyurethane carriers include 4200 Series Polyurethane Marine Sealant and 5200 Series Polyurethane Marine Sealant both manufactured by 3M® Corporation. The thermally conductive particles suspended within the carrier are selected at least in part, based upon minimizing the likelihood of electrolysis or corrosion of the adjoining surfaces (i.e., the housing **105** and the cover member **610**).

One or more keyed rotary adjusters **620** are disposed in, on, or about the housing **105**. The keyed rotary adjusters **620** are used to attach or otherwise affix the light fixture **600** to a mounting member which can then be attached to an external structure, for example, a stationary or shipboard structure.

Each of the rotary keyed adjusters **620** includes a central cavity **625** to accept the insertion of a threaded or smooth shaft physically supporting the light fixture **600** and a plurality of peripheral cavities **630** to accept the insertion of a key member to fix the position of the light fixture **600** with respect to the mounting member. Both the central cavity **625** and the plurality of peripheral cavities **630** can be of any size or geometric configuration suitable for mounting and aiming or otherwise directing the first and second configurable throw patterns **130**, **135** generated by the light fixture **600**. The central cavity **625** and the peripheral cavities **630** only partially penetrate through the keyed rotary adjuster **620** body to prevent water from passing through the keyed rotary adjuster cavities **625**, **630** into the housing **105**. The central cavity **625** and all or a portion of the peripheral cavities **630** can be internally smooth finished or internally threaded to accommodate the insertion of a threaded fastener such as a screw or bolt.

An example keyed rotary adjuster **620** is about 1.50 inches in diameter and about 1.25 inches tall. An example central cavity **625** has a diameter of about 0.375 inches a depth of about 1.00 inch, and in some instances can be threaded to accommodate the insertion of a threaded shaft, for example, using a X16 tap. The plurality of peripheral cavities **630** can be equally or unequally angularly spaced at about 0.50 inches center to center around the central cavity **625**. For example, a total of eight (8) peripheral cavities can be equally angularly spaced at about 45° intervals about the central cavity, each of the peripheral cavities having a diameter of about 0.125 inches and a depth of about 0.25 inches.

Any or all of the keyed rotary adjusters **620** are disposed partially or completely outside the housing **105**. In some embodiments, the keyed rotary adjusters **620** can be mounted entirely on the exterior surface of the housing **105**, for example, by externally fillet welding about the perimeter of the keyed rotary adjuster **620** and the housing **105**. In other embodiments, the keyed rotary adjuster **620** partially extends

into the interior of the housing **105**, for example, by insertion through an appropriate sized aperture disposed in the housing **105**. Where the keyed rotary adjuster **620** partially extends into the interior of the housing **105**, the adjuster can be attached to the housing an interior fillet weld, an exterior fillet weld, or both interior and exterior fillet weld (i.e., back-welded into the housing **105**). Regardless of the manner used to secure the keyed rotary adjusters **620** to the housing **105**, the central cavity **625** and the peripheral cavities **630** remain accessible from the exterior of the housing **105**.

An at least partially transparent member **635** at least partially fills the opening **110** in the housing **105**. The at least partially transparent member **635** permits the passage of the first configurable throw pattern **130** and the second configurable throw pattern **135** from the reflector **115** to the ambient exterior environment surrounding the light fixture **600**. The thickness, size, shape, and configuration of the at least partially transparent member **635** is based in whole or in part upon the geometry of the opening **110**, for example, a larger opening **110** may require the use of a thicker at least partially transparent member **635** than a smaller opening **110**. The at least partially transparent member **635** can include a member composed of a glass material, a polymeric material, or a laminated material comprised of either or both glass and/or polymeric materials. An example material for the at least partially transparent member **635** is an ultraviolet (UV) tempered glass.

The at least partially transparent member **635** may be partially or completely transparent or translucent. The at least partially transparent member **635** may have a tint or other coloration to provide illumination in any desired color from the light fixture **600**.

In some instances, the at least partially transparent member **635** is coupled or otherwise attached to the housing **105** after the manufacture of the light fixture **600**. For example, the light fixture **600** may be shipped without the at least partially transparent member **635** and any reflective throw pattern adjustment members **125** installed. Subsequent to manufacture, one or more reflective throw pattern adjustment members **125** are installed, for example, based upon the requirements of the user. Subsequent to the installation of the one or more reflective throw pattern adjustment members **125**, the at least partially transparent member **635** is installed to protect the housing **105** against water intrusion. Thus to provide a configurable light fixture **600** easily tailored to operational requirements, either or both the one or more reflective throw pattern adjustment members **125** and the at least partially transparent member **635** are installable subsequent to the manufacture of the light fixture **600**.

To minimize the likelihood of water intrusion, and to thermally couple the at least partially transparent member **635** to the housing, a thermally conductive sealant material **640** can be disposed at least partially about the perimeter of and between the at least partially transparent member **635** and the housing **105**. Thermally coupling the at least partially transparent member **635** to the housing **105** allows conductive heat flow from the housing to the at least partially transparent member **635**. Heating the at least partially transparent member **635** minimizes the likelihood of fogging or formation of condensation on the surface of the at least partially transparent member **635**.

The thermally conductive sealant material **640** can be the same as or different from the thermally conductive sealant material **615** disposed between the cover member **615** and the housing **105**. The thermally conductive sealant material **640** includes thermally conductive particles dispersed in a carrier, for example, a polyurethane sealant such as 4200 Series Polyurethane Marine Sealant and 5200 Series Polyurethane Marine Sealant both manufactured by 3M® Corporation. In some instances, the thermally conductive sealant material **640** is applied after manufacture of the light fixture **600**, prior to the installation of the at least partially transparent member **635**.

A light controller **650** coupled to each of the solid state light sources **505** provides the proper current, voltage, and power delivery to the solid state light sources **505**. The light controller **650** can be mounted or otherwise attached or coupled to an interior surface of the housing **105**, for example, the light controller **650** can be attached to the cover member **610** as depicted in FIGS. **6** and **6**A. Example light controllers **650** include the Xitanium LEDINTA1050C140DO and LEDINTA700C140F3O lighting controllers manufactured by Philips Electronics® or the LF1048-88-00700 lighting controller manufactured by Mag-Tech Industries®.

In some instances, a power converter **660** may be coupled to some or all of the light controllers **650** to provide power corresponding to the input specifications of the light controller **650**. For example, the power converter **660** can adjust the voltage and/or frequency of the incoming alternating current (AC) power as needed to satisfy the power requirements of the light controller **650**. The power converter **660** can be mounted or otherwise attached or coupled to an interior surface of the housing **105**, for example, the light controller **650** can be attached to the cover member **610** as depicted in FIGS. **6** and **6**A.

FIG. **7** shows a mounting member **705** couplable to the plurality of keyed rotary adjusters **620** on the lighting fixture **600**. The sectional elevation view depicted in FIG. **7**A provides a view of the complimentary keyed rotary adjuster **710** on the mounting member **705**. FIG. **7**B shows the mounting member **705** coupled to the light fixture **600** as depicted in FIG. **6**. The light fixture **600** can be coupled to a mounting member **705** such as the illustrative swivel yoke mounting member **705** depicted in FIG. **7**. The mounting member **705** can include a number of complimentary keyed rotary adjusters **710** to couple with or otherwise engage the keyed rotary adjusters **620** disposed on the housing **105**. For the example arrangement depicted in FIGS. **7** and **7**B, the mounting member **705** contains two complimentary keyed rotary adjusters **710** to engage the two lateral keyed rotary adjusters **620** disposed on the housing **105**.

The mounting member **705** can include any structure suitable for engaging at least one of the keyed rotary adjusters **620** disposed on the light fixture **600**. In some instances, the mounting member can include a "U"-shaped member having a complimentary keyed rotary adjuster **710** on each of the parallel legs as depicted in FIGS. **7** and **7**B. Any structurally sound metallic or non-metallic material can be used for the mounting member, however ambient environmental conditions may limit the choice to a corrosion resistant material such as ASTM 316 or 316L Stainless Steel.

The complimentary keyed rotary adjuster **710** includes a central shaft **715** surrounded by one or more peripheral apertures **720**. The peripheral apertures **720** extend through both the complimentary keyed rotary adjuster **710** and the mounting member **705** to accommodate the passage of one or more key members **725** through the peripheral aperture **720** into at least one of the peripheral cavities **625** in the keyed rotary adjuster **620**. The passage of a key member **725** through the peripheral aperture **720** into at least one of the peripheral cavities **625** in the keyed rotary adjuster **620** fixes or otherwise locks the rotation of the light fixture **600** about the shaft **710**.

While an example complimentary keyed rotary adjuster **710** is depicted as having a solid center shaft **715**, one or more replacement elements not depicted in FIGS. **7**, **7**A, and **7**B can be substituted for the shaft **710**. For example, the shaft **710** can be replaced with an internally smooth or threaded aperture extending through both the complimentary keyed rotary adjuster **710** and the mounting member **705**. An appropriately sized bolt can then be passed through the mounting member **705** and the complimentary keyed rotary adjuster **710**, and threaded into the keyed rotary adjuster **620**.

The complimentary keyed rotary adjuster **710** can be attached or otherwise fastened to the mounting member **705** using mechanical fasteners or by thermal fusion. Some or all of the peripheral apertures **720** in the keyed rotary adjuster **710** can extend through the mounting member **705** to permit the passage of the key member **725**. In some instances all or a portion of the peripheral apertures **720** can be internally smooth finished. In other instances all or a portion of the peripheral apertures **720** can be internally (i.e. female) threaded to accommodate the insertion of a threaded key member **725** such as a screw or bolt.

An example complimentary keyed rotary adjuster **710** includes a shaft **715** having a length of about 0.9375 inches and a diameter of about 0.3125 inches. Each of the peripheral apertures **720** has a diameter of at least 0.25 inches to accommodate the passage of a key member approximately 0.25 inches in diameter to the peripheral cavities **630** disposed in the keyed rotary adjuster **620**.

Another example complimentary keyed rotary adjuster **710** includes a central aperture instead of a shaft **710**. The central aperture has a diameter of about 0.4375 inches to accommodate the passage of a 0.375 inch diameter bolt through the aperture and into the central cavity **625**. Where the keyed rotary adjuster central cavity **625** is internally threaded, the light fixture **600** can be secured by tightening the bolt within the keyed rotary adjuster **620**. Each of the peripheral apertures **720** has a diameter of at least 0.25 inches to accommodate the passage of a key member approximately 0.25 inches in diameter to the peripheral cavities **630** disposed in the keyed rotary adjuster **620**.

FIG. **7**B depicts a light fixture **600** coupled to a mounting member **705** using two laterally opposed keyed rotary adjusters **620** disposed on opposite sides of the light fixture **600**. A plurality of key members **725** pass through the peripheral apertures **720** and reside within the keyed rotary adjuster peripheral cavities **630**. The installation of the key members **725** fixes the rotation of the light fixture **600** about the axis defined by the shafts **710**.

A mounting fixture **725** is disposed in, on, or about the mounting member **705**. The mounting fixture **725** permits the attachment of the mounting member **705** to an external structure, for example, a shipboard external structure. Attaching the mounting member **705** to an external structure via the mounting fixture **725** provides a stable, secure attachment; fixing the rotation of the light fixture **600** with respect to the mounting member **705** by inserting one or more key members **725** into the peripheral cavities in the keyed adjustment member **620** can provide a desirable stable, secure mounting of the light fixture **600** with respect to the external structure.

The various embodiments described above can be combined to provide further embodiments. All of the U.S. patents, U.S. patent application publications, U.S. patent applications, foreign patents, foreign patent applications and non-patent publications referred to in this specification and/or listed in the Application Data Sheet, including but not limited to U.S. Provisional Application Ser. No. 61/551,296, are incorporated herein by reference, in their entirety. Aspects of the embodiments can be modified, if necessary to employ concepts of the various patents, applications and publications to provide yet further embodiments.

For example, while generally discussed in terms of a marine environment, the light fixtures described herein may be employed in a large variety of other environments or applications. For instance, the light fixtures may be employed in freight yards, warehouses, rail yards, factories or any other environment where a configurable throw pattern and/or environmental protection are desired.

These and other changes can be made to the embodiments in light of the above-detailed description. In general, in the following claims, the terms used should not be construed to limit the claims to the specific embodiments disclosed in the specification and the claims, but should be construed to include all possible embodiments along with the full scope of equivalents to which such claims are entitled. Accordingly, the claims are not limited by the disclosure.

The invention claimed is:

1. A light fixture, comprising:

a housing having an interior separated by the housing from an exterior ambient environment, the housing having at least one opening between the interior and the exterior ambient environment; and

at least one reflector at least partially received by the housing and which has a first and a second configurable throw pattern that extends outwardly from the at least one opening, the configurable throw patterns having respective ones of at least one subtended angle, the at least one reflector comprises a first reflector having four reflective sides which include a first pair of opposed reflective sides and a second pair of opposed reflective sides, the reflective sides of each of the first and the second pairs of reflective sides angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment, the first reflector having a number of coupling features to selectively install, after manufacture of the light fixture, at least one reflective throw pattern adjustment member, the number of coupling features includes a first pair of slots in the first pair of opposed reflective sides and a second pair of slots in respective ones of the first pair of opposed reflective sides, the second pair of slots spaced laterally across the first reflector from the first pair of slots, the first and the second pair of slots each sized and dimensioned to securely and removably receive one of the at least one reflective throw pattern adjustment member, the first pair of slots disposed at a different angle than the second pair slots measured with respect to the first reflector, and a first one of the subtended angles of the first configurable throw pattern has a first value when the reflective throw pattern adjustment member is not installed and the first one of the subtended angles of the first configurable throw pattern has a second value after the reflective throw pattern adjustment member is installed, the second value of the first one of the subtended angles different from the first value of the first one of the subtended angles.

2. The light fixture of claim **1** wherein a first one of the subtended angles of the second configurable throw pattern has a first value when the reflective throw pattern adjustment member is not installed and the first one of the subtended angles of the second configurable throw pattern has a second value after the reflective throw pattern adjustment member is installed, the second value of the first one of the subtended angles different from the first value of the first one of the subtended angles.

3. The light fixture of claim 1 wherein a first one of the subtended angles of the second configurable throw pattern has a first value when the reflective throw pattern adjustment member is not installed, the first value of the first one of the subtended angles of the second configurable throw pattern approximately the same as the first value of the first one of the subtended angles of the first configurable throw pattern.

4. The light fixture of claim 1 wherein the at least one reflector includes the first reflector and a second reflector mounted in a side by side relationship to the housing, and further comprising:

a first solid state light source positioned with respect to the first reflector such that the first reflector reflects at least a portion of the light emitted by the first solid state light source in the first configurable throw pattern; and

a second solid state light source positioned with respect to the second reflector such that the second reflector reflects at least a portion of the light emitted by the second solid state light source in the second configurable throw pattern.

5. The light fixture of claim 4 wherein the second reflector has at least four reflective sides which include a first pair of opposed reflective sides and a second pair of opposed reflective sides, the reflective sides of each of the first and the second pairs of reflective sides angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment.

6. The light fixture of claim 5 wherein the at least one reflective throw pattern adjustment member includes at least a first and a second reflective throw pattern adjustment member and the number of coupling features includes a first pair of slots in respective ones of the first pair of opposed reflective sides of the first and second reflectors and a second pair of slots in respective ones of the first pair of opposed reflective sides of the first and second reflectors, the second pair of slots spaced laterally across the first reflector from the first pair of slots, the first and the second pair of slots sized and dimensioned to securedly receive respective ones of the first and the second reflective throw pattern adjustment members.

7. The light fixture of claim 6 wherein the slots in the first one of the reflective sides of the first opposed pair of reflective sides are angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment, and the slots in the first one of the reflective sides of the second opposed pair of reflective sides are angled outwardly with respect to one another from the interior of the housing toward the exterior ambient environment.

8. The light fixture of claim 7 wherein an angle between the slots in the first one of the reflective sides of the first pair of opposed reflective sides is different than an angle between the slots in the first one of the reflective sides of the second pair of opposed reflective sides.

9. The light fixture of claim 1, further comprising at least one keyed rotary adjuster coupled to the housing to rotate the housing about at least one axis, the keyed rotary adjuster including a central cavity to accept the insertion of a shaft, surrounded by a plurality of peripheral cavities to accept the insertion of a key member to fix the housing at a fixed angle of rotation about the shaft.

10. The light fixture of claim 9, wherein the housing includes an exterior surface and the at least one keyed rotary adjuster is affixed to the exterior surface of the housing.

11. The light fixture of claim 9, wherein the housing includes an interior surface and the at least one keyed rotary adjuster is at least partially affixed to the interior surface of the housing and is accessible from outside of the housing.

12. The light fixture of claim 1, further comprising a transparent member received into the opening of the housing, the transparent member coupled at least in part to the housing by a thermally conductive sealant material disposed at least partially between the transparent member and the housing to seal the opening and conductively transfer heat between the housing and the transparent member.

13. The light fixture of claim 1, further comprising a heat transfer member at least partially coupled to the housing at least in part by a thermally conductive material disposed at least partially between the heat transfer member and the housing to conductively transfer heat from the housing to the heat transfer member.

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